Quantization of the Hydrogen Cosmos: The N-Ladder and ϕ-Scaling of Resonant Modes

Section 1 – Introduction: Why N Matters

In the Fundamental Unified Nature Theory (FUNt), all structure—from atomic shells to galactic lattices—arises from a single recursive law of resonance governed by the golden ratio (φ). This recursion defines both microstate transitions (indexed by n) and the total coherence capacity (N) of a system. The quantity N represents the total number of φ-spaced resonance bands accessible to any bounded field. It bridges quantum discreteness with cosmological continuity, replacing arbitrary quantization with a natural logarithmic progression tied to φ.

While quantum theory traditionally describes energy levels through discrete integers, FUNt introduces a geometric progression based on φ, capturing self-similarity across scales. This reveals that stability, coherence, and structure emerge not from force balance, but from resonance alignment within a universal hydrogen lattice.

Section 2 – Derivation and Definition of N

The FUNt formalism begins with the fundamental frequency law:

$$E_n = h\nu_0\varphi^n$$

Here, h is Planck's constant, ν_0 is the base resonance frequency, and n is the mode index representing each hydrogen resonance band (HRB). This law captures how each successive mode represents a φ-step in energy and phase coherence.

The total number of accessible modes, N, is defined as the ratio of the maximum to minimum measurable frequencies within a bounded field:

$$N = \ln(\nu_max / \nu_min) / \ln(\varphi)$$

This simple logarithmic law is dimensionless and universal. It quantifies the total φ-spaced modes within any physical or biological system. For hydrogen atoms, this spans electronic, vibrational, and nuclear transitions; for stars and galaxies, it defines the spacing of acoustic and gravitational modes.

The elegance of this formula lies in its scale invariance: doubling the frequency range adds a fixed number of φ-bands, regardless of the system. Thus, N acts as a universal coherence constant, defining how many discrete resonance states fit within a given physical domain.